PROCEEDINGS OF THE BIOLOGICAL SOCIETY OF WASHINGTON
113(2):465–479. 2000.

# *Euphilomedes cooki,* a new species of myodocopid ostracode from Moreton Bay, SE Queensland, Australia

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*Abstract.*—A new species of myodocopid ostracode in the subfamily Philomedinae from Moreton Bay, S.E. Queensland, Australia, is described and illustrated. A key is presented to the ten known species of *Euphilomedes* having primary furcal claws 1, 2, 4, and 6.

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This work describes and illustrates a new species of myodocopid ostracode from Moreton Bay, S.E. Queensland, Australia, which is north of Brisbane, near the southern end of the Great Barrier Reef.

*Disposition of specimens.*—The holotype and paratypes have been deposited at the Queensland Museum (QM), South Brisbane, Queensland.

Superorder Myodocopa Sars, 1866
Order Myodocopida Sars, 1866
Suborder Myodocopina Sars, 1866
Family Philomedidae Müller, 1906

This family contains two subfamilies, Philomedinae Müller, 1906, and Pseudophilomedinae Kornicker, 1967, both with representatives in the vicinity of S.E. Queensland, Australia (Kornicker 1994).

### Philomedinae Müller, 1906

This subfamily includes eight genera: *Philomedes* Liljeborg, 1853, *Pleoschisma* Brady, 1890, *Scleroconcha* Skogsberg, 1920, *Paraphilomedes* Poulsen, 1962, *Euphilomedes* Kornicker, 1967, *Anarthron* Kornicker, 1975, *Igene* Kornicker, 1975, and *Zeugophilomedes* Kornicker, 1983. A new species of *Euphilomedes* is described herein.

### *Euphilomedes* Kornicker, 1967

*Type species.*—*Euphilomedes nodosa* Poulsen, 1962 (subsequent designation by Kornicker 1967).

*Composition.*—Including the new species described herein this genus includes 19 species plus one subspecies (Kornicker 1991:3; 1995:16).

*Distribution.*—The genus is cosmopolitan except in Arctic and Antarctic waters. The known depth range is shallow water to 2250 m, but members have been collected mostly from the continental shelf and upper slope (Kornicker & Harrison-Nelson 1997: 14). Three species of the genus have been reported previously from the vicinity of Australia: *E. corrugata* (Brady 1897) from off Port Jackson and in Flinders Passage at depths of 3.7–18.3 m, *E. walfordi* Poulsen, 1962, from the Coral Sea at a depth of 50 m, and *E. erynx* Kornicker, 1995, from the continental slope off New South Wales at a depth of 220 m. The new species described herein is from Middle Banks, northern Moreton Bay, S.E. Queensland, Australia, at a depth of 15–25 m.

### *Euphilomedes cooki,* new species
Figs. 1–9

*Etymology.*—The species is named in honor of Stephen Cook formerly of the Queensland Museum, Australia, who collected some of the specimens.

*Holotype.*—Queensland Museum W2492, undissected adult female in alcohol.

*Type locality.*—Middle Banks, northern Moreton Bay (27.02°S, 153.25°E), Queensland, Australia, about 20 km offshore from the mainland, depth 15–25 m. All specimens part of Queensland Museum Registration Number 11879.

*Paratypes.*—12 adult females; 3 A-1 males; 1 A-1 female.

*Distribution.*—Middle Banks, northern Moreton Bay, S.E. Queensland, depth 15–25 m, clean sand or sand and shell. Collected with Smith-McIntyre grab in November 1983 and November 1984.

*Description of adult female* (Figs. 1-7a–7c).—Carapace elongate with shallow incisur (Fig. 1a). Left valve extends past right valve along free margin. Posterodorsal hinge area straight and without valve overlap.

Ornamentation: Carapace with pits of various sizes and shapes. Each pit with narrow raised border. Some pits two or three times larger than others; pits larger in posterior half of valve. Valve edge with long single bristles. Long single bristles sparsely distributed on valve surface.

Infold: Rostral and anteroventral infold (Fig. 1b,c,e, 7a), infold of caudal process and posteroventral infold (Fig. 1d,f, 7b), each with row of bristles. Anteroventral infold with several parallel ridges (Fig. 1c).

Selvage: Broad lamellar prolongation of right valve in vicinity of rostrum with long marginal hairs; lamellar prolongation narrower and with shorter marginal hairs along ventral margin. Lamellar prolongation of left valve obscured.

Central adductor muscle attachments (Fig. 1g): About 30 attachments on each side. These represented by large pits on each valve just anterior to midlength; most pits ventral to midheight.

Carapace Size (mm): Average length 1.89, range 1.81–1.95; average height 1.36, range 1.29–1.42; average height 72% of length, range 71–74; *n* = 11.

| | Length | Height | Height % length |
|---|---|---|---|
| Holotype | 1.94 | 1.39 | 72 |
| Paratypes | 1.84 | 1.37 | 74 |
| | 1.95 | 1.40 | 73 |
| | 1.95 | 1.42 | 73 |
| | 1.87 | 1.37 | 71 |
| | 1.81 | 1.31 | 71 |
| | 1.91 | 1.36 | 73 |
| | 1.93 | 1.41 | 72 |
| | 1.86 | 1.33 | 73 |
| | 1.87 | 1.37 | 71 |
| | 1.81 | 1.29 | 71 |

First antenna (Fig. 2a): 1st joint with distal medial spines forming rows. 2nd joint with dorsal, ventral, and lateral spines, and 3 bristles (1 dorsal, 1 ventral, 1 medial). 3rd joint short with 3 bristles (2 dorsal, 1 ventral). 4th joint with 6 bristles (2 dorsal, 4 ventral). 5th joint about same length as 4th joint, with long sensory bristle with about 7 short marginal filaments. Long medial bristle of 6th joint with base near dorsal margin and with long proximal and short distal spines. 7th joint: a-bristle similar to bristle of 6th joint; b-bristle with 2 filaments near midlength, 2 subterminal filaments, and bifurcate tip; c-bristle long with marginal filaments. 8th joint: d- and e-bristles long, bare, and with blunt tips; f- and g-bristles long with marginal filaments. Not all filaments of bristles of 7th and 8th joints shown in illustration.

Second antenna: Protopodite bare. Endopodite 2- or 3-jointed (Fig. 2b): 1st joint with row of 5 short bare proximal bristles and 1 very long spinous distal bristle; 2nd joint with very long spinous proximal bristle (bristle 2 ½ times length of long bristle of 1st joint) and short bare terminal bristle (the terminal bristle could be interpreted to be on a 3rd joint). Exopodite: 1st joint with minute straight medial terminal bristle; bristle of 2nd joint reaching well past 9th joint, with few dorsal spines and abundant short, fairly stout, ventral spines, no natatory hairs; bristles of 3rd and 4th joints with short slender distal spines, no natatory

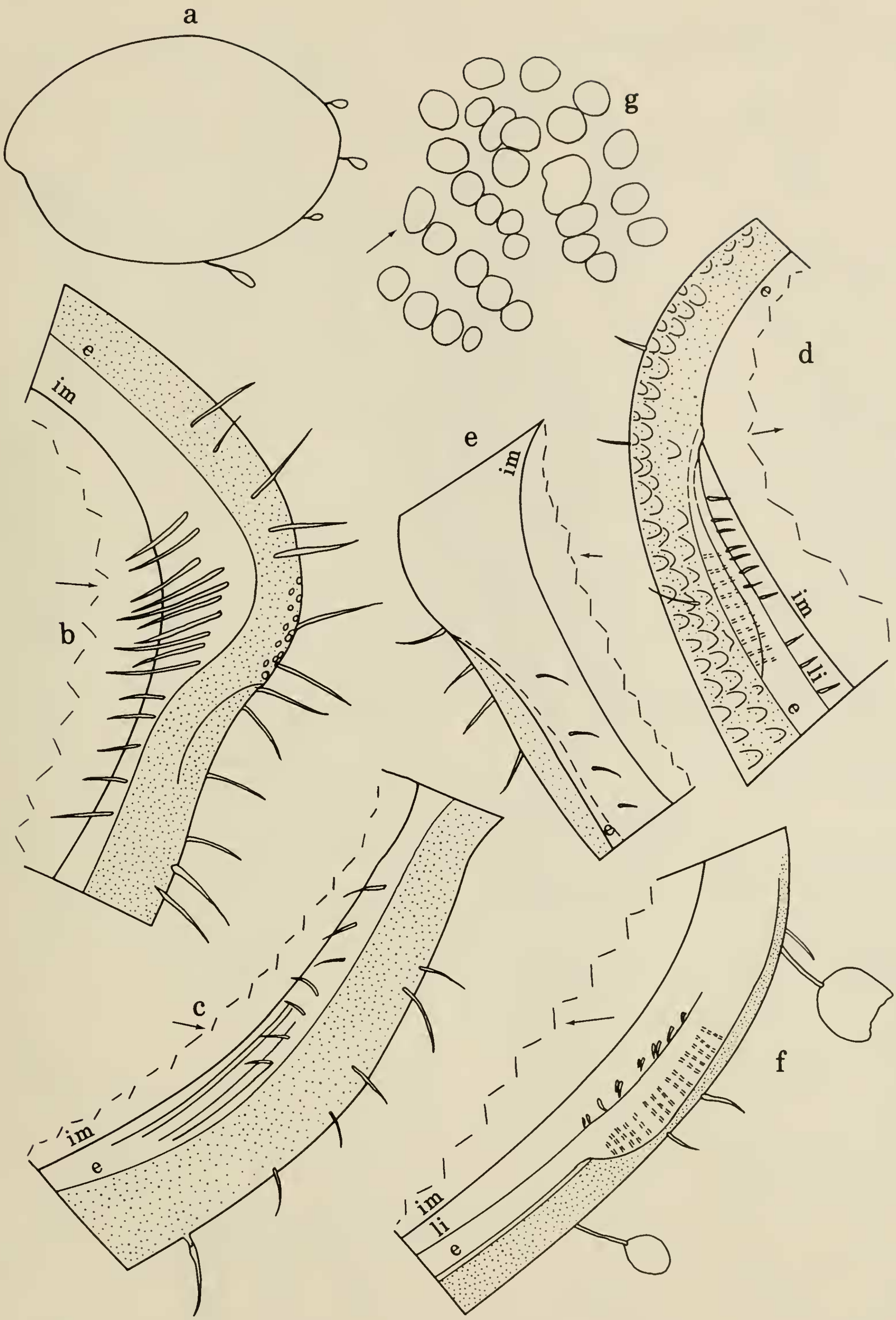

Fig. 1. *Euphilomedes cooki* specimen 12, adult female paratype: a, outline of complete specimen from left side, length 1.84 mm, note four epibionts attached to edge of valve. b–d, interior views of left valve: b, anterior end; c, anteroventral margin; d, posterior end. e, f, interior views of right valve: e, anteroventral margin; f, posteroventral margin. g, ends of central adductor muscles projecting from right side of body, anterior toward right. Abbreviation are: ant: antenna; Bo: Bellonci organ; cx: coxale; e: edge of valve; end: endopodite; ex: exopodite; epip: epipodite; fu: furca; gen: genitalia; gird: girdle; im: inner margin of infold; li:list; lv: lateral view; me: medial eye; mnd: mandible; mv: medial view; mx: maxilla; nabs: not all bristles shown; prot: protopodite; ul: upper lip; Y-scl: Y-sclerite. Roman numerals designate endites. Arrow on illustration indicates anterior.

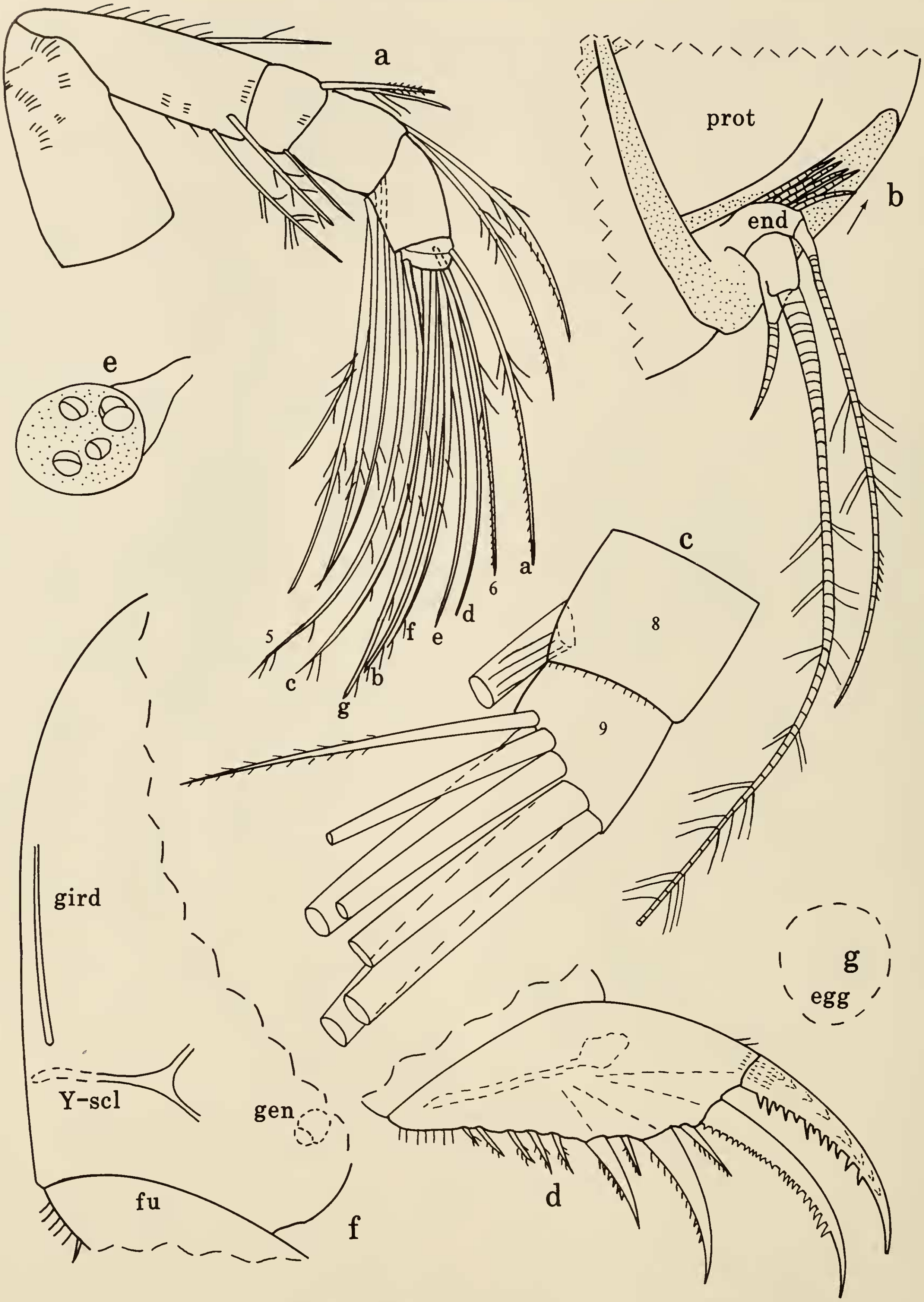

Fig. 2. *Euphilomedes cooki* specimen 12, adult female paratype: a, right 1st antenna, lv; b, left 2nd antenna, endopodite and distal part of protopodite, mv; c, right 2nd antenna, exopodial joints 8 and 9, only proximal parts of some bristles shown, lv; d, right furcal lamella, lv; e, left lateral eye, lv; f, posterior of body from right side; g, outline of unextruded egg, drawn at same scale as "f". (For abbreviations see Fig. 1.)

hairs; bristles of joints 5–8 longer than bristles of joints 2–4, with natatory hairs, no spines; 9th joint with 7 bristles (4 long and 2 short with natatory hairs, 1 very short and with short marginal spines (Fig. 2c, only proximal parts of some bristles shown); joints 2–8 with row of terminal spines.

Mandible (Fig. 3a, b): Coxale endite spinous, tip bifurcate, with small ringed bristle near base. Basale: medial surface and ventral and dorsal margins with rows of spines; medial surface with 5 bristles in proximal ventral corner (3 pectinate unringed, 2 ringed and with long proximal and short distal spines), and 1 short ringed bristle closer to midlength with long proximal and short distal spines; dorsal margin with 3 bristles (1 near midlength, 2 terminal); 7 bristles with long proximal and short distal spines present on or near ventral margin (2 longest bristles distal and with bases on ventral margin; 5 shorter bristles with bases slightly lateral). Exopodite slightly more than ½ length of dorsal margin of 1st endopodial joint, with distinct distal hirsute pad and few terminal spines, and 2 bristles (outer bristle with short marginal spines and about ⅓ length of inner bristle; inner bristle reaching midlength of 2nd endopodial joint, with long spines near midlength and short distal spines). 1st endopodial joint with medial spines and 4 ventral bristles. 2nd endopodial joint: dorsal margin with 2 long bristles in proximal group and 5 spinous bristles in distal group (2 long with basis on margin; 3 short with bases medial (proximal 2 with long spines, distal 1 with short spines)); ventral margin with bristles in 2 groups (2 in proximal group, 3 in distal group); medial surface with spines forming rows. 3rd endopodial joint with 3 pectinate claws (dorsal claw short), and 3 ringed bristles.

Maxilla (Figs. 3b, 4a–c): Precoxale and coxale with fringe of long hairs. Coxale with plumose dorsal bristle. Basale with 3 distal bristles. Exopodite with 3 bristles (proximal short bristle bare, long middle bristle with long spines, other long bristle with short spines). 1st endopodial joint with 1 alpha-bristle and 4 beta-bristles. 2nd endopodial joint with 3 pectinate claw-like bristles and about 7 ringed bristles. Endites with stout spinous and pectinate bristles (endite I with 9 bristles, endite II with 6 bristles, endite III with 8 bristles).

Fifth limb (Figs. 4d–f, 5): Epipodite with 46 bristles. Endite I with 5 bristles (only 3 shown in illustration); endite II with 6 bristles; endite III with 8 bristles. 1st exopodial joint: anterior side with 2 bristles (with long spines) on distal edge; outer corner with 2 small slender bristles with few marginal hairs; main tooth with proximal peg followed by 3 pointed teeth (teeth worn down on specimen 12) and 1 large squarish tooth; ringed spinous bristle proximal to teeth. 2nd exopodial joint: posterior side with 1 proximal bristle and group of 3 distal bristles (middle bristle long, others short (short bristle obscured on right limb of specimen 12)). 3rd exopodial joint: inner lobe with 3 bristles, outer lobe with 2 bristles with long spines. Fused 4th and 5th exopodial joints with 8 bristles.

Sixth limb (Figs. 5a, 6a): Epipodite with 3 spinous bristles. Endite I with 3 bristles; endite II with 4 bristles; endites III and IV each with 9 bristles. End joint with spines and hairs and 18 bristles (most with long proximal hairs and short distal spines).

Seventh limb (Fig. 6b, c): Each limb with 13–15 bristles: proximal group with 8–10 bristles (specimen 12: 5 or 6 on peg side, 4 on comb side; specimen 4 (right limb), 5 on peg side, 3 on comb side), each bristle with 3–5 bells and marginal spines; terminal group with 5 bristles (3 on peg side, 2 on comb side). Each bristle with 3–7 bells and marginal spines. Terminal comb with 12 alate teeth; 2 small curved pegs (with proximal teeth) present opposite comb.

Furca (Fig. 2d, f): Each lamella with 11 claws: claws 1, 2, 4, and 6 primary; claws 3, 5, 7–11 secondary. Primary claws with stout posterior teeth; teeth of claw 1 stouter than teeth of other primary claws and with stout medial teeth; secondary claws with

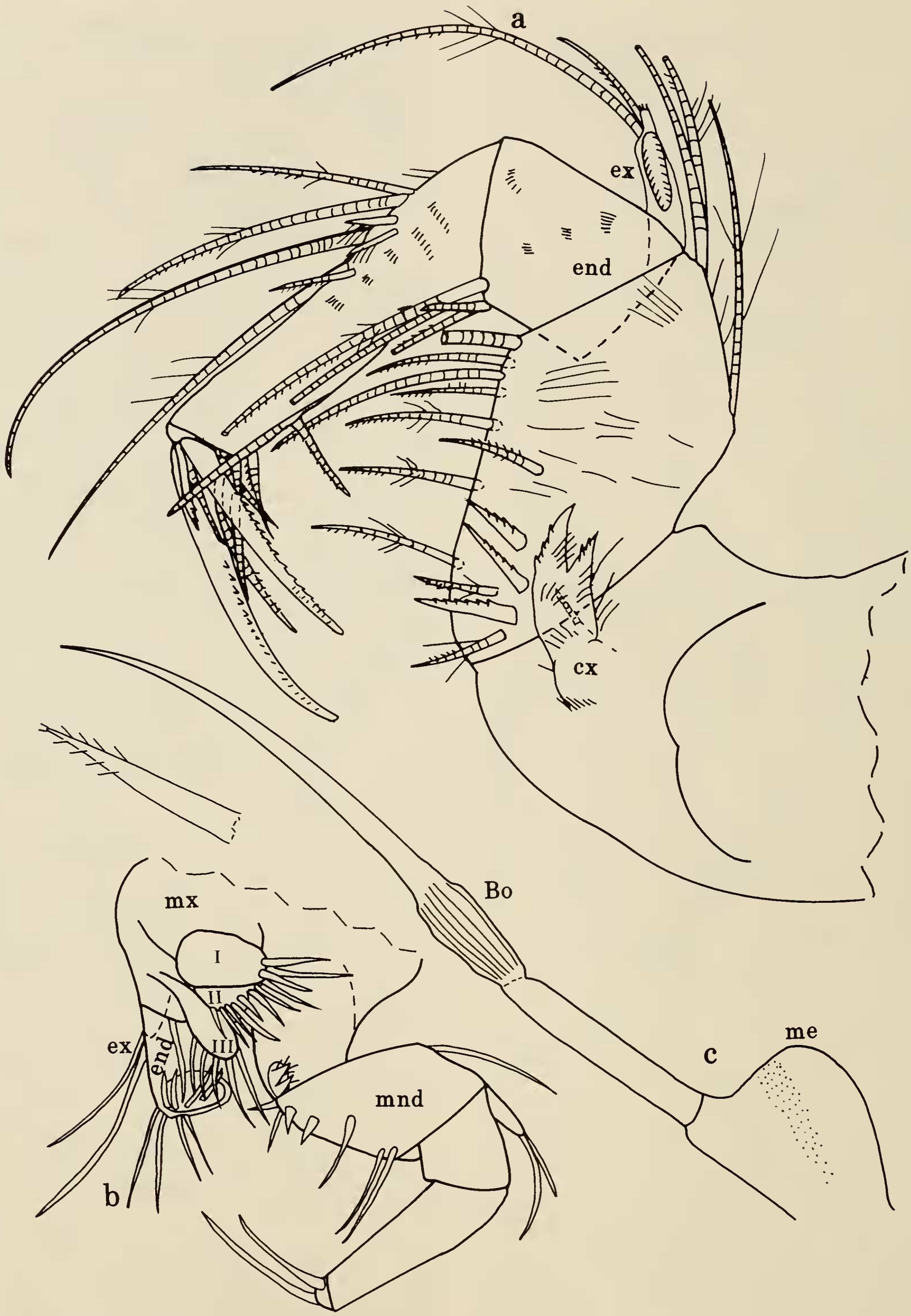

Fig. 3. *Euphilomedes cooki* specimen 12, adult female paratype: a, right mandible, mv; b, left maxilla and mandible in place on body, nabs, mv; c, medial eye and Bellonci organ from left side. (For abbreviations see Fig. 1.)

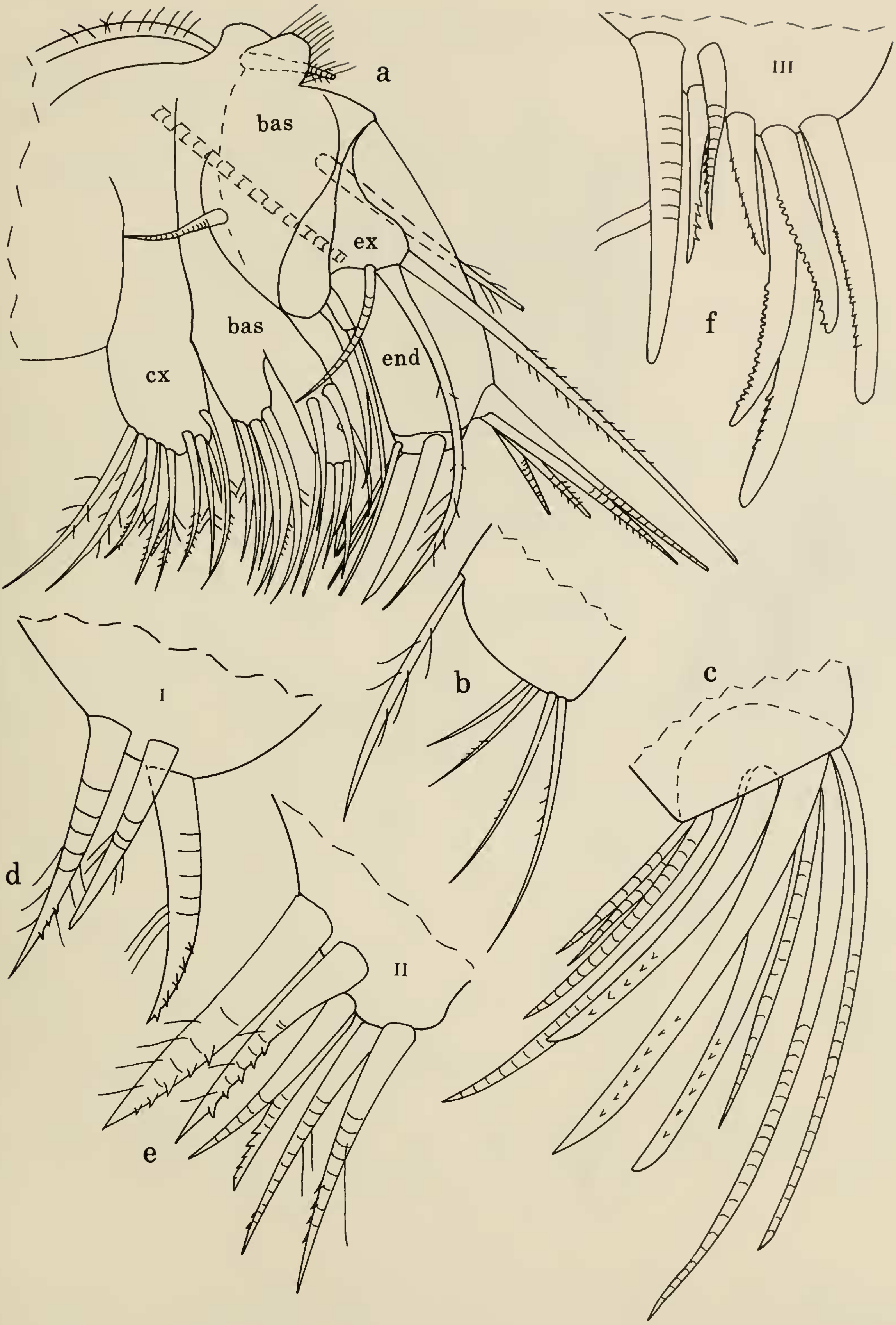

Fig. 4. *Euphilomedes cooki* specimen 12, adult female paratype: a–c, right maxilla: a, complete limb, lv; b, bristle of distal end of 1st exopodial joint, mv; c, bristles and claws of 2nd endopodial joint, mv. d–f, left 5th limb, endites I, II, and III, respectively. (For abbreviations see Fig. 1.)

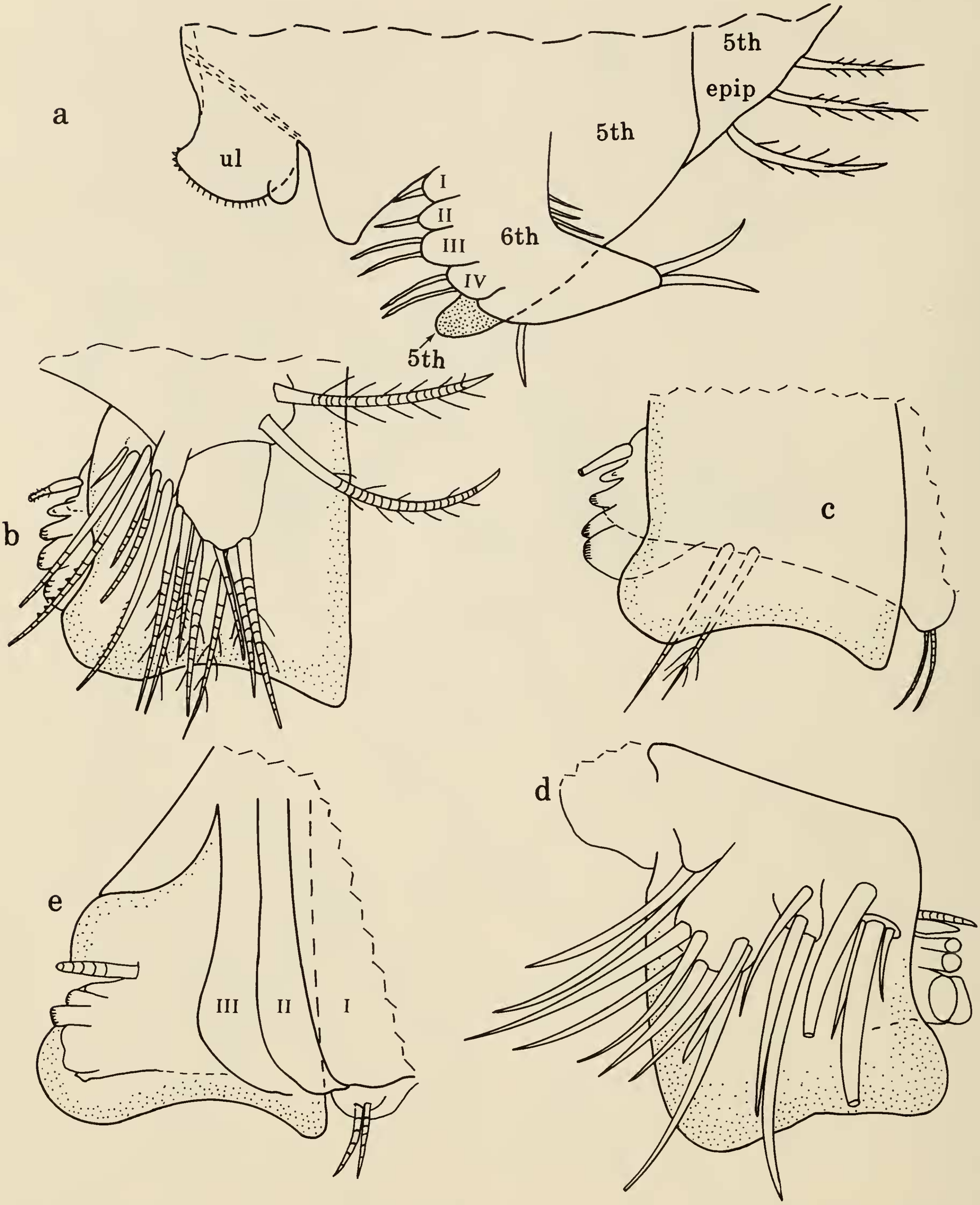

Fig. 5. *Euphilomedes cooki* specimen 12, adult female paratype: a, upper lip, left 6th limb, and right 5th limb in place on body, not all bristles shown. b, c, posterior views of distal end of right fifth limb, respectively. d, e, posterior and anterior views of distal end of left fifth limb, respectively. (For abbreviations see Fig. 1.)

marginal spines. Right lamella with few distal anterior spines and also spines medial and proximal to claw 1. Right lamella anterior to left by ¾ width of claw 1.

Bellonci organ (Fig. 3c): Elongate with short wide part (bearing striations) near midlength and narrow tapered tip bearing minute spines.

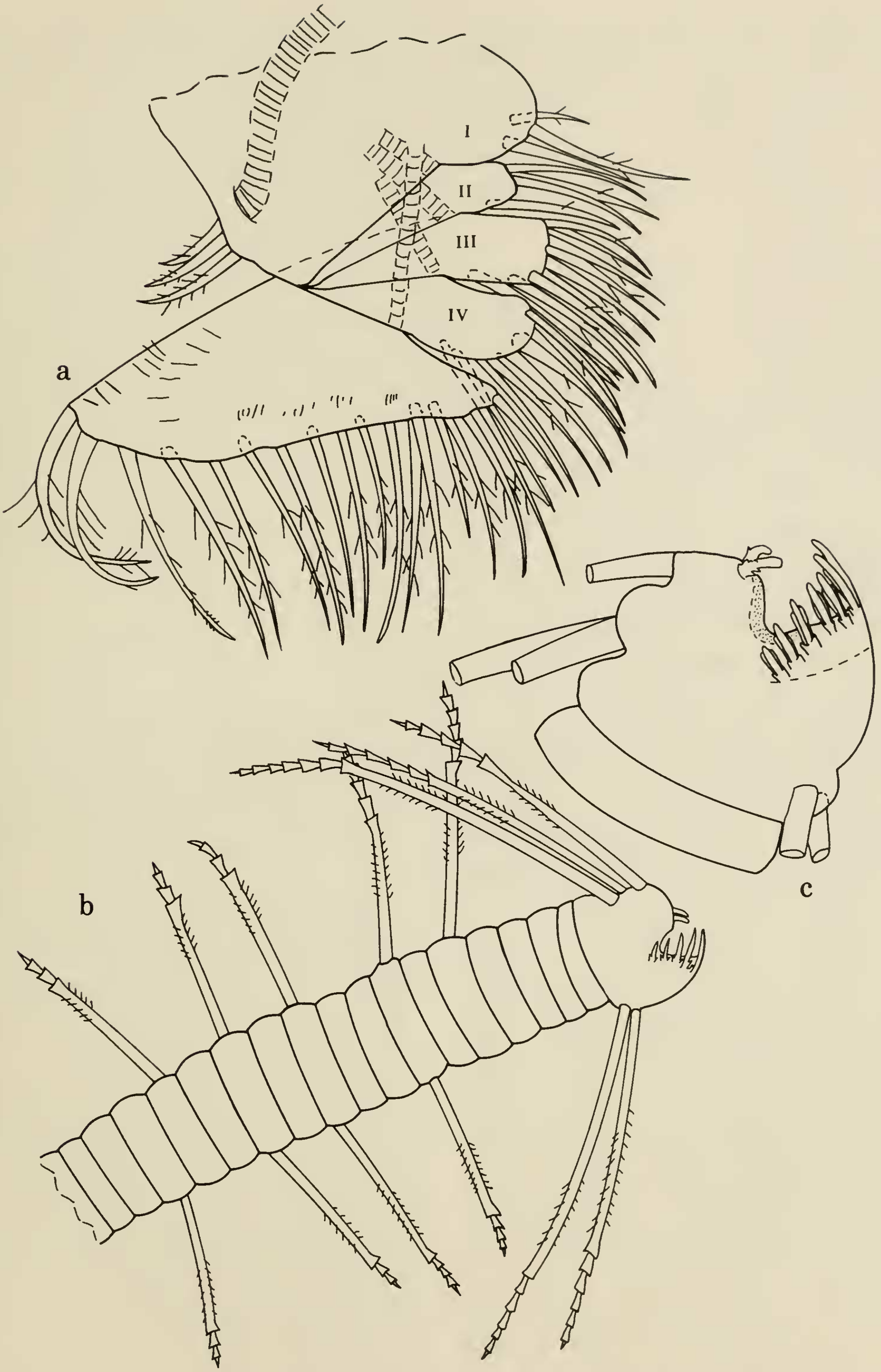

Fig. 6. *Euphilomedes cooki* specimen 12, adult female paratype: a, right 6th limb, lv; b, right 7th limb; c, tip of left 7th limb, only proximal part of bristles shown. (For abbreviations see Fig. 1.)

Eyes: Medial eye with brown pigment (Fig. 3c). Lateral eye smaller than medial eye, unpigmented, with 4 divided amber-colored ommatidia (Fig. 2e).

Upper lip (Figs. 5a, 7c): Projecting slightly anteriorly, with anterior and lateral glandular processes.

Genitalia (Fig. 2f): Small oval.

Anterior of body: Convex.

Posterior of body (Fig. 2f): Evenly rounded, bare.

Y-sclerite (Fig. 2f): With ventral branch.

Number and lengths of eggs: Specimen 12 with about 16 unextruded eggs (Fig. 2g). Specimen 4 with 18 eggs in marsupium (lengths of 2 eggs 0.406 mm, 0.408 mm).

Gut content: Specimen 12 with unrecognizable amber-colored particles in gut.

Epizoa: Specimens 12 and 4 with vase-shaped protistans along posterior margin (Fig. 1a, f).

*Description of A-1 male* (Fig. 7d–f).—Carapace similar in shape and ornamentation to that of adult female.

Carapace size (length, height in mm): 1.59, 1.06, height 67% of length (specimen 13); 1.58, 1.13, height 72% of length.

Second antenna: Protopodite bare with narrow slightly curved proximal pivotal sclerite. Endopodite 3-jointed (Fig. 7d): 1st joint short with 4 small proximal ringed bristles and 1 distal long stout ringed bristle (broken off in illustrated endopodite (Fig. 7d)); 2nd joint elongate with 3 small ringed bristles; 3rd joint elongate with 2 small ringed terminal bristles with short spines. Exopodite 9-jointed: 1st joint with small medial terminal spine; bristle of 2nd joint less than twice length of exopodite, with spines along ventral edge; bristles of joints 3–8 fairly short, longer than bristle of 2nd joint, but less than twice length of exopodite, with ventral spines stouter than those of bristle of 2nd joint, without natatory hairs; 9th joint with 6 bristles (2 short lateral at distal dorsal corner, 4 longer terminal (longest at ventral end and less than twice length of exopodite)), all with marginal spines, without natatory hairs; joints 2–8 with row of spines along terminal edges.

Fifth limb (Fig. 7e, f): Similar to that of adult female.

Sixth limb: With 3 epipodial bristles. Endite I with 3 bristles; endite II with 4 bristles; endite III with 8 bristles.

Seventh limb: Limb with 12 tapered bristles with marginal spines: proximal group with 7 bristles (3 on comb side, 4 on peg side), each with 2 or 3 bells; terminal group with 5 bristle (2 on comb side, 3 on peg side), each with 2–5 bells. Terminus with comb of about 11 alate teeth opposite 2 small pegs.

Furca: Similar to that of adult female except with only 4 secondary claws following primary claw 6.

Lateral eye: Well developed with many ommatidia and black pigment between them.

*Description of A-1 female* (Figs. 8,9).—Carapace similar in shape and ornamentation to that of adult female, but narrower.

Carapace size (length, height in mm): 1.58, 1.02; height 65% of length (specimen 1).

*Remarks.*—The absence of natatory hairs on bristles of the exopodite of the 2nd antennae of A-1 males and females indicates that the juveniles of this species are incapable of efficient swimming.

*Comparisons.*—Each lamella of the furca of the new species *E. cooki* bears primary claws 1, 2, 4, and 6, secondary claws 3 and 5, and 5 additional secondary claws following primary claw 6. Only one species of *Euphilomedes* having a similar distribution of primary and secondary claws has been described previously from the vicinity of Australia, *E. walfordi,* which is known from only the adult male, and so is not directly comparable in all morphological characters to the adult female and A-1 instar male of *E. cooki* described herein. However, the following differences between the adult male of the *E. walfordi* and the adult female of *E. cooki* are considered significant: 1, The carapace length of the adult female *cooki* is

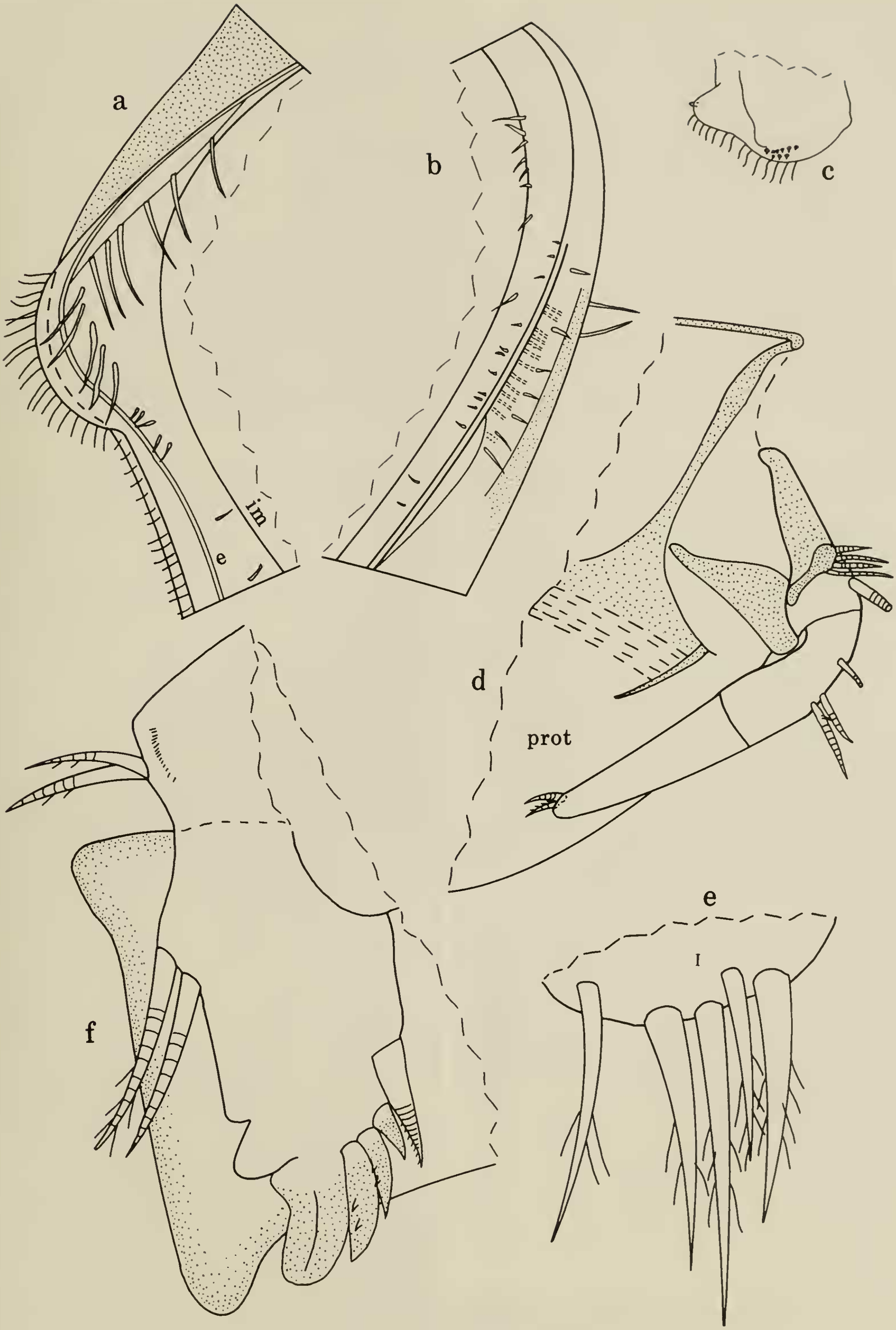

Fig. 7. *Euphilomedes cooki* specimen 2, adult female paratype: a, b, interior views of anterior and posterior ends of right valve, respectively; c, upper lip, anterior toward left. d, specimen 13, A-1 male paratype, left 2nd antenna, endopodite and distal part of protopodite, mv. e, f, right 5th limb, av: e, distal end endite I. (For abbreviations see Fig. 1.)

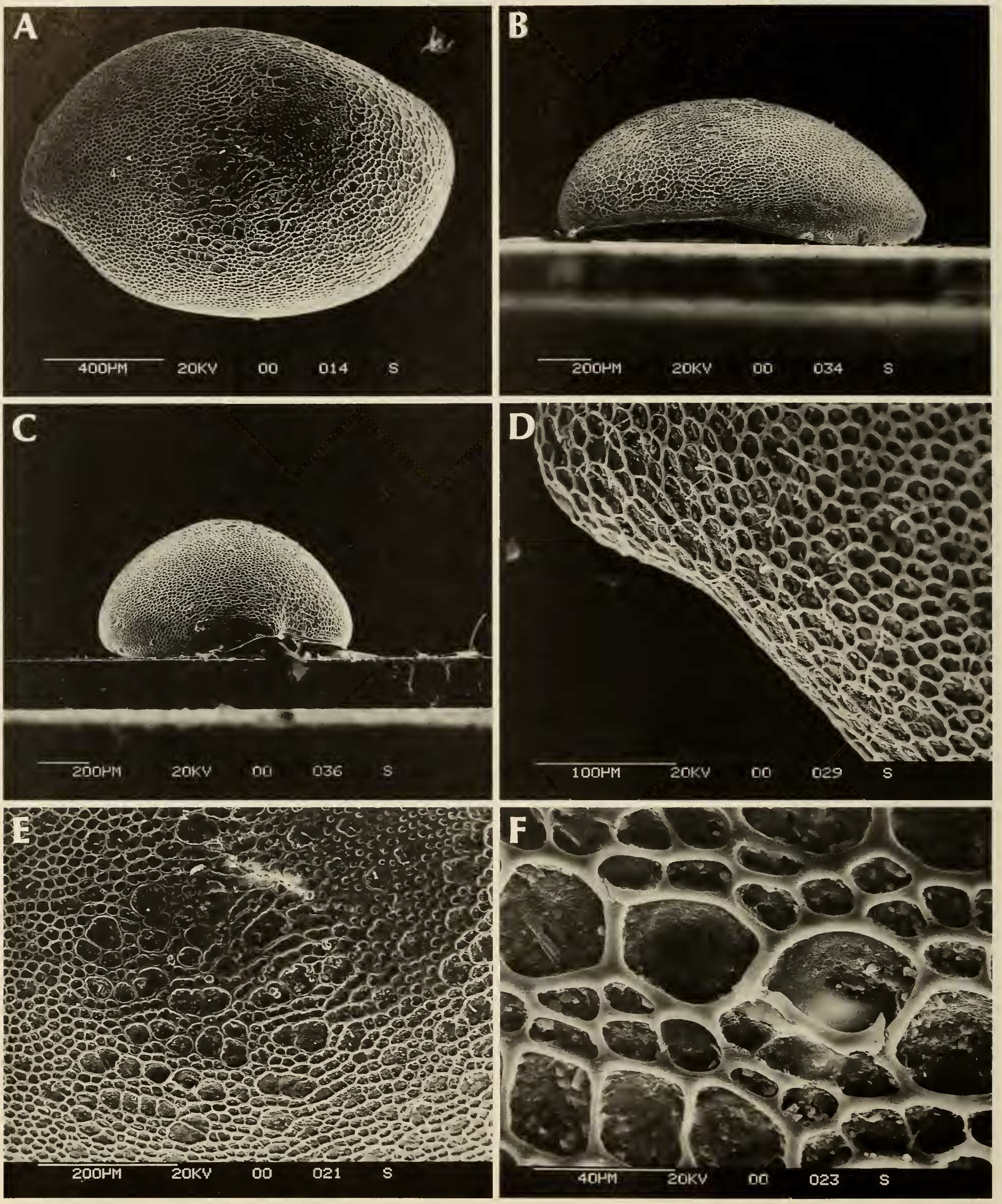

Fig. 8. *Euphilomedes cooki,* A-1 female paratype (specimen 1), left valve: a, lateral view of valve, length 1.58 mm; b, dorsal view of valve, anterior to left; c, anterior view of valve, ventral to right; d, anteroventral margin of valve, lv, from "a"; e, area in vicinity of central adductor muscle, from "a"; f, detail of reticulations, from lower left part of "e".

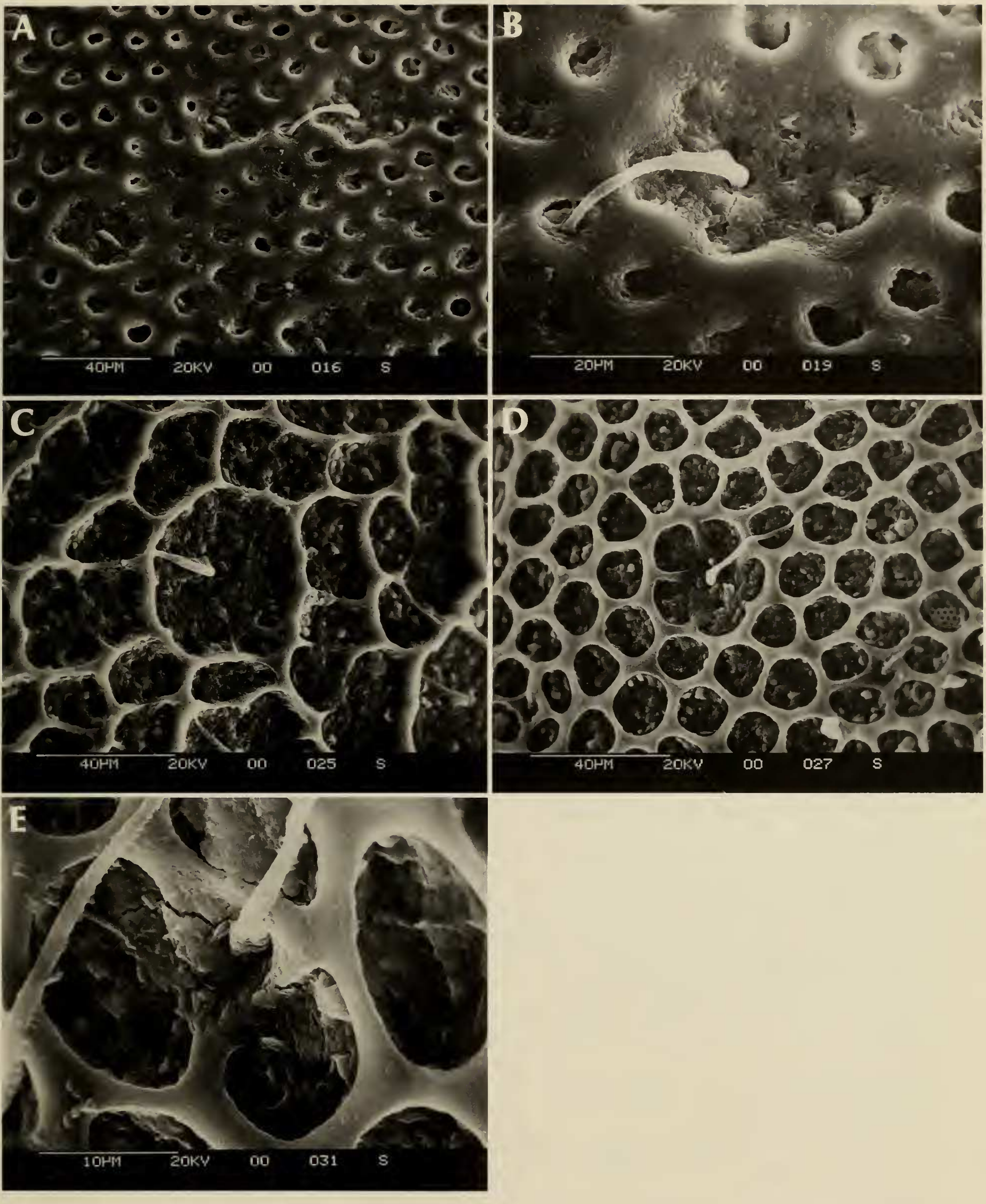

Fig. 9. *Euphilomedes cooki* A-1 female paratype (specimen 1), left valve: a, detail of pits and bristles in upper right part of Fig. 8a; b, detail of bristle shown in upper right of "a"; c, detail of bristle and reticulations in posterior part at midheight of Fig. 8a; d, detail of bristle and reticulations in anterior part at midheight of Fig. 8a; e, detail of bristles and reticulations near incisure in Fig. 8d.

1.73–1.95 mm compared to 3 mm for the adult male *walfordi*; 2, the outer surface of the carapace of the adult female *cooki* has few hairs, whereas that of the adult male *walfordi,* according to Poulsen (1962:371), "is densely covered with short hairs". The seventh limb of the adult male *walfordi* has 19 bristles without marginal spines (Poulsen 1962:372), whereas that limb of the adult female *cooki* has 13–15 bristles with marginal spines (when differences occur in the number of bristles on the 7th limbs of male and female myodocopids, the male generally has fewer bristles than the female).

The key to species of *Euphilomedes* presented below is restricted to those species having furcal lamellae with primary claws 1, 2, 4, and 6, and secondary claws 3, 5, and 7+.

### Key to species of *Euphilomedes* having furcal claws 1, 2, 4, and 6 primary*

1. Lower angle of posterior shell margin with small tooth .................... ......... *E. sinister* (Kornicker, 1974)
1. Lower angle of posterior shell margin without tooth ...................... 2
2. Seventh limb with less than 12 cleaning bristles ......................... 3
2. Seventh limb with 13–15 cleaning bristles ................... *E. cooki,* n. sp.
2. Seventh limb with more than 15 cleaning bristles ...... *E. walfordi* (Poulsen, 1962)
3. 2nd joint of endopodite of female 2nd antenna with only the long plumose bristle ............. *E. africana* (Klie, 1940)
3. This joint with an additional distal bristle .................................. 4
4. The distal bristle is only a spine, shorter than the width of the joint .......... ............. *E. japonica* (Müller, 1890)
4. This bristle slightly longer than width of joint ........................... *E. morini* (Kornicker & Harrison-Nelson, 1997)
4. This bristle longer than twice the width of the joint ....................... 5
5. This bristle is placed dorsally on the joint ......... *E. nodosa* (Poulsen, 1962)
5. This bristle is placed on the narrow tip of the joint ....................... 6
6. Furca with more than 12 pairs of claws .............. *E. smithi* (Poulsen, 1962)
6. Furca with 11 or less pairs of claws ... 7
7. Shell with a dorso-posterior, chitinized process ...... *E. producta* (Poulsen, 1962)
7. Shell without such process .......... ............. *E. longiseta* (Juday, 1907)

* Key adapted in part from the key to species of the genus *Euphilomedes* in Poulsen (1962:362).

## Acknowledgments

Collections of specimens from Moreton Bay described herein were made by P. Saenger and S. Cook, Queensland Museum, Australia. We thank Matthew Kane, Smithsonian Institution (SI) volunteer, for inking penciled camera lucida drawings of appendages, Walter Brown (SI) for SEM micrographs of the carapace, and Andrew R. Parker, University of Oxford, for reviewing the manuscript.

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